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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/055,545	01/22/2002	Ivan Yang-En Wu	JCLA6997	8856

7590 03/26/2003

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EXAMINER
CHUNG, DAVID Y

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 03/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/055,545	WU ET AL.	
	Examiner	Art Unit	
	David Y. Chung	2871	

-- The MAILING DATE of this communication appears on the cover sh et with the correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-16 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-16 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Objections

1. Claim 7 objected to because of the following informalities: The claim recites a method according to claim 1. However, claim 1 is not a method claim. Appropriate correction is required.

2. Claims 10-16 objected to because of the following informalities: The base claim recites a thin-film transistor array substrate, whereas the dependent claims recite a multi-domain vertical alignment liquid crystal display according to claim 10. Appropriate correction is required.

Double Patenting

3. Applicant is advised that should claim 12 be found allowable, claim 13 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-16 rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (U.S. 6,424,396) in further view of Ikeno et al. (U.S. 6,008,875).

As to claim 1, Kim et al. discloses a vertically aligned multi-domain liquid crystal display. Note in figure 2, stepped portion 14 and pixel electrode 11 formed on the stepped portion and having an aperture pattern P1.

Kim et al. does not disclose a planarized dielectric layer on the pixel electrode. Ikeno et al. discloses a liquid crystal display wherein a leveling layer is formed on the surface of an uneven electrode. In figure 7, a leveling layer 9 is buried in the recess portions of transparent electrode 6'. Leveling layer 9 is made of organic or inorganic material having a permittivity equal to or smaller than that of the liquid crystal layer. Ikeno et al. teaches that with the leveling layer, the thickness of the liquid crystal layer is uniform regardless of the unevenness of the transparent electrode, which suppresses the fluctuation of the orientation of liquid crystal molecules. This contributes to the improvement of the display characteristics. See column 4, line 64 – column 5, line 6. Therefore, it would have been obvious to one of ordinary skill in the art at the time of

invention to add the leveling layer of Ikeno et al. to the display of Kim et al. in order to improve the display characteristics.

As to claims 2 and 11, Kim et al. discloses glass substrates 10 and 20 in figure 2.

As to claim 3, Kim et al. discloses that gate wiring, data wiring, and thin film transistors are provided on the lower substrate 10. See column 3, lines 18-23.

As to claim 4, Kim et al. discloses that a color filter and black matrix are provided on upper substrate 20. See column 3, lines 18-23.

As to claims 5, 12 and 13, Kim et al. discloses a multi-domain display in figure 2 wherein the extension directions of the protrusions and slits are parallel to each other.

As to claim 6, Kim et al. does not disclose a multi-domain display wherein the extension directions of the protrusions and slits are not parallel to each other. However, it was well known and obvious to extend the protrusions and slits at an angle to each other in order to create more than 2 pixel domains. This allowed the viewing angle to be improved in both the horizontal and vertical directions. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to extend the protrusions and slits at an angle to each other in order to improve the viewing angle in both the horizontal and vertical directions.

As to claims 7 and 14, Kim et al. discloses a multi-domain display in figure 2 wherein the slits and protrusions are alternately arranged.

As to claim 8 and 15, Ikeno et al. discloses a leveling layer in which the protruded portions of the transparent electrode are exposed. See figure 7. Note portions of the pixel electrode corresponding to distance d1. Ikeno et al. teaches that with this structure, the voltage applied to the liquid crystal layer is substantially reduced on the recess portions of the transparent electrode, fluctuating the electric field in one pixel, and improving the gray scale characteristics. See column 5, lines 7-16. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to expose the protruded portions of the pixel electrode in order to improve gray scale characteristics.

As to claim 9 and 16, Ikeno et al. does not disclose a leveling layer on the pixel electrodes wherein the thickness on the protruded portions is thinner than that on recessed portions. However, type of leveling layer was well known and obvious for protecting against ion migration between the pixel electrode and the liquid crystal layer. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to provide this type of leveling layer in order to protect against ion migration.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Chung whose telephone number is (703) 306-0155. The examiner can normally be reached on Monday-Friday from 8:30 am to 5:00 pm.

SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

David Chung
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03/22/03